EVALUATION OF NUTRITION EDUCATION IN THE FAMILIES IN TRANSFORMATION (*FIT*) PROGRAM

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ABSTRACT

This study evaluated the effects of nutrition education on children participating in a short-term pediatric weight management program. Participants received nutrition education led by a registered dietitian one night per week for 45 minutes for 8 weeks. Topics included healthy snacking, portion sizes, MyPlate, and food label reading. Students, ages 7-13 years, completed a pre- and post-program health habits survey, nutrition quiz, and a food frequency questionnaire. Height, weight and blood pressure were also measured pre and post-program. Significant differences were found in fruit and vegetable, dairy and water consumption in the post-food frequency questionnaire. Significant differences between pre and post-program means of anthropometric and health data were seen for diastolic blood pressure in girls, changing from 67.82 ± 6.00 to 59.90 ± 9.31 and for the group as a whole (66.63 ± 8.81 to 63.75 ± 11.81). Resting heart rate also changed significantly for boys (76.78 ± 5.45 to 90.10 ± 7.68) and the total group (83.69 ± 8.60 to 93.13 ± 20.73). Nutrition-related knowledge increased throughout the program and a decrease in television viewing among participants was reported in the post-health habits survey. Relatively strong, positive Pearson's correlation coefficients were calculated for the mean student data for the food frequency questionnaire versus program week as the students reported eating more fruit (correlation coefficient: 0.898322608) and drinking more water (correlation coefficient: 0.937756778). These results suggest that short-term weight management programs may have an impact on the nutritional knowledge and healthy eating behaviors of children.

DEDICATION

I would like to dedicate this thesis to my loving parents.

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There are a number of people without whom this thesis might not have been possible, and to whom I am grateful for.

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I. INTRODUCTION

Obesity has become a global epidemic. In the past 30 years, obesity rates have doubled for children and quadrupled for adolescents (Ogden, Carroll, Kit, & Flegal, 2014; United States Department of Health and Human Services, 2012). According to the Mississippi Department of Health, forty percent of Mississippi children are overweight or obese (2014). This is a cause for great concern because childhood obesity has been associated with the increased risk for many preventable chronic diseases such as coronary heart disease, type 2 diabetes and some cancers (Flegal, Carroll, Kuczmarski, & Johnson, 1998; Mokdad *et al.,* 2003). In addition, obesity can lead to lower self-esteem which can impact a child's emotional well-being. In response to national concern, Healthy People 2020, a set of goals developed by the Office of Disease Prevention and Health Promotion, has addressed weight status objectives and the needs of children with common goals of increasing the proportion of patient visits to physicians that included counseling about nutrition or diet and reducing the proportion of children and adolescents who were considered obese (2010).

The Academy of Nutrition and Dietetics addressed the prevention and treatment of pediatric obesity through a position paper with the following statement:

> For prevention of child and adolescent overweight and obesity, school-based evidence reviews, recent studies, and current recommendations all indicate the importance of multilevel approaches that involve various components of sectors of influence. Consistent messages across these sectors are critical and can be reinforced through community-level interventions and social marketing (Hoelscher , Kirk, Ritchie, & Cunningham-Sabo,2013).

In response to the obesity epidemic among children, a number of childhood obesity interventions have been established in Mississippi, however, many of these programs tend to be underfunded and difficult for schools and clinics to implement (C4MHP, 2010; C4MHP, 2011; C4MHP, 2012; C4MHP, 2013). Short-term educational interventions may be beneficial in the prevention of childhood obesity and a solution to the the financial burdens that are often seen with it, if they can be shown to be effective in improving children's knowledge about the risk factors of obesity and healthy dietary behaviors (C4MHP, 2013).

There is limited research available on measures to confirm the retention of nutritional knowledge. The purpose of this study is to determine the effectiveness of a nutrition education delivered through a pediatric weight management program

II. EVALUATION OF LITERATURE

Delivery of Nutrition Education

In its position paper on pediatric weight management, the Academy of Nutrition and Dietetics suggests a systems-level approach (Hoelscher *et al,* 2013). It is also recommended that the skills of a registered dietitian be included in pediatric weight management programs to help participants achieve sustainable dietary habits (Ogden *et al.,* 2014). The American Academy of Pediatrics recommends that these programs have 26 to 75 or more hours of contact time to be effective (Spear *et al.,* 2007). Programs that have allowed participants to receive nutrition education from a registered dietitian have been most successful in reducing pediatric weight status (National Center for Health Statistics, 2011). Nemet, Barken, Epstein, Friedland, Kowen, & Elikam, conducted a weight management intervention study that encouraged participants to meet with a dietitian throughout the three-month duration of the study. Results showed that this intervention was associated with decreases in participant body mass index, reduced body fat, and increased physical activity and improved fitness, indicating healthier eating behaviors (2005). These results indicate that the delivery of nutrition education through a registered dietitian has a significant effect on the success rate of weight management programs; however, some researchers suggest that the delivery of nutrition education from a registered dietitian may not produce a more significant result in reducing pediatric weight status (Flegal *et al.,* 1998). These results may be due to a shorter program duration and time spent with a registered dietitian.

International recommendations suggest that any weight management should include the core elements of nutrition education and participation by the family (Mokdad *et al.,* 2001). There is a significant amount of research that indicates a positive correlation between the dietary habits of parents and their children; therefore, the delivery of nutrition education to the family and child could have a positive impact on the success rate of pediatric weight management programs (Jinks, English, & Cosgrove, 2010). The Healthy Home Offerings via the Mealtime Environment (HOME) intervention involved families in ten monthly, two-hour nutrition education sessions to promote healthier eating habits and family mealtimes. Nutrition education sessions incorporated parents and children, aged 8-12 years, new topics and goals related to healthy eating habits, taste testing, and discussion. Results showed that 31% of participants completed all intervention sessions. This evidence supports the value of a community-based, family-focused intervention program to promote healthier eating habits (Flattum *et al.*, 2015). Although many programs that have delivered nutrition education to both families and children have seen a decrease in waist circumference, body mass index (BMI), and improvements in fitness and lifestyle, indicating healthier dietary habits, Davidson e*t al.,* concluded that family-centered interventions are rarely used in obesity prevention research (Davidson, Lawson, & Coatsworth*,* 2011; Healthy People 2020, 2010; Hoelscher *et al,* 2013; Mokdad *et al.,* 2003). In addition, The Academy of Nutrition and Dietetics noted that most studies to date have lacked a parental component or shown that parental involvement has significant effects on program outcomes (Mokdad *et al.,* 2003). This was illustrated in a study conducted by Steele *et al.,* reported that regardless of family involvement, during a 10 week intervention program, body

mass index (BMI) scores showed no improvement post-treatment and had significantly increased at the one-year follow-up (2012).

Length of Intervention

It has been suggested that intervention programs aimed at the treatment of pediatric obesity last at least three months or until weight management goals are met (The Academy of Nutrition and Dietetics, 2014). However, obesity can be a life-long condition. It is important that healthy weight management habits are implemented for the long-term. There is limited literature regarding long-term interventions and their effects on weight management. Muckelbaurer, Libuda, & Clausen, reported that long-term surveillance should be an essential component of obesity weight management programs (2009).

Although the most effect pediatric weight management programs are long-term, short-term programs have shown progress (Gately *et al.,* 2005; Golan *&* Crow, 2004; Nemet *et al.,* 2005; Olvera, Leung, Kellam, & Liu, 2013). Short term programs may not always result in a reduction in body weight due to the length of the program; however, other positive effects may be seen, including a reduction in adiposity, improvement in cardiovascular and diabetes risk factors, and an increase in healthy behaviors and physical fitness (Hadley, Hair, & Dreisbach, 2010).

Nemet *et al.* conducted a combined dietary, behavioral, and physical activity intervention for pediatric patients to determine the beneficial effects of short and long-term interventions. Measures were taken during the 3 month duration of the program as well as at the 1 year follow-up. Results indicated that favorable short-term effects such as dietary habits and physical activity remained one year after the intervention (2005). These results suggest that

short-term interventions may be effective in the development of positive, healthy behaviors for pediatric weight management.

Nutrition Education and Behavior Change

Weight management interventions for children that target behavior modification have been the most successful in facilitating weight loss, and in its position paper, the Academy of Nutrition and Dietetics' states that no evidence of adverse effects with behavioral interventions has been found, indicating that a lifestyle behavioral change approach to weight management may be best (C4MHP, 2011; Hoelscher *et al,* 2013). However, O'Dea has raised the question as to whether or not these programs create distorted eating attitudes and adverse psychological consequences among the participants (2005). Results from the MEND program suggest otherwise. Scores measured on the global self-esteem scale showed a significant increase in self-esteem in participants during the intervention period. These scores suggest that participation in the weight management program was related to psychological benefit rather than negative consequence (Sacher *et al.,* 2010). In addition, these results also propose that a well conducted weight management program for pediatric patients could positively impact the emotional health of the participants.

Programs that change dietary and physical activity behavioral patterns appear to be effective in decreasing BMIs of overweight children (Hoelscher *et al.,* 2013). Programs such as Family Start use goal setting to making significant changes in food related behaviors. By using SMART goals, participants were able to work towards weight management related goals throughout the course of the program. Results from FamilyStart showed an improvement in nutrition related behaviors and activity levels through the participant's achievement of SMART

goals (C4MHP, 2010). Programs that implement goal setting as a positive behavior allow participants to feel empowered to use new skills gained through the program.

Components of Successful Weight Management Programs

In their recommendations for the Pediatric Weight Management Nutrition Practice, the Academy of Nutrition and Dietetics addressed the need to identify components of successful weight management programs. The recommendations include multidisciplinary interventions, including diet, physical activity, nutrition counseling, and parent participation (2014). Citing recommendations from primary prevention literature, the Academy suggested that the most successful interventions include both nutrition and physical activity as physical activity alone has not been as effective without incorporating nutrition education (Mokdad *et al.,* 2001).

Dietary factors that are correlated with a decreased risk of overweight should be included in weight management programs. The Centers for Disease Control and Prevention recommends that children be encouraged to choose low-fat and low-sugar foods, healthy beverages and more fruits and vegetables (2000). The Kids Choice intervention program addressed these topics through nutrition education lectures and rewards for healthy eating behaviors. Results showed an improvement in body mass index as well as fruit and vegetable consumption by participants (Hendy, Williams, & Camise, 2011). Nutrition education sessions that promote healthy eating have been effective in pediatric weight management programs. Sessions that include healthy eating advice, reading of food labels, and other advice to promote simple gradual dietary changes have resulted in behavior change and lower body mass index scores (Strauss, 2000). The Nutrition Detectives program was developed to educate school aged students regarding the selection of healthful foods. Students included in the intervention received nutrition education

through 5 mini lessons that introduced nutrition label reading and healthful food choices. This was assessed using nutrition labels discussed throughout the program and included on a 10 question test instrument asking participants to choose the more healthful option. Results from the intervention program exhibited significant increases in nutritional knowledge and dietary patterns compared to baseline. This suggests that brief pediatric weight management interventions can impart a practical skill related to food choice to children (Katz *et al.,* 2011).

Evaluation of Weight Management Programs

To measure nutritional knowledge retention, few studies have developed questionnaires that inquire about healthy eating behaviors and exercise, as well as questionnaires to examine the self-reported behavior of dietary patterns and physical activity (Flegal *et al., 1*998). Some researchers, such as Strauss, have reported that there are limitations when taking measures of weight to determine the success of the delivery of nutrition education (2000).

The weight management program, We Can!, introduced by the National Institute of Health (2005), is designed to give parents, caregivers, and children education and encouragement to maintain a healthy weight. Participants are provided with tools, fun activities, and more to promote healthy eating, increases in physical activity, and reduced screen time. To evaluate the effectiveness of nutritional knowledge respondents were asked to respond to true or false questions. For instance, whether a serving size is the total amount of food a person is served or chooses to eat at one time while a portion size if the standard amount of food. Correct responses were scored as a one and incorrect answers were scored as a zero. To determine significant changes in knowledge a t-test of the mean difference was conducted. Attitudes regarding portion sizes, healthy eating, and energy balance were assessed using a questionnaire. Participants were

asked to indicate importance using a scale where "1" indicated very unimportant and "5" indicated very important. For example, "Do you agree that reducing portion sizes of foods high in fat is important?". A t-test was used to determine significant increases from pre to post-test among all respondents. (2005).

A crucial component to the evaluation of pediatric weight management programs involves the staff members. The HOME intervention program mandated that all staff members were trained to study protocols and food safety practices. Group nutrition education sessions were facilitated by a Registered Dietitian as well as a Registered Nurse. Observations of group sessions were conducted at 3,6, and 9 months by trained staff members using a standardized checklist (Flattum *et al.*, 2015).

The Social Cognitive Theory Model (SCT) is an extensively used model for developing elementary level nutrition education programs. This theory emphasizes that human behavior depends on the reciprocal interaction of personal, behavioral, and environmental factors (Glanz, Rimer , & Viswanath, 2008). With the increasing need for theory-based intervention programs that target behavior change, a valid and effective measurement tool is needed to evaluate the impact of SCT-based interventions. Hall, Chai, Koszewski, & Albrecht, developed a 40-item instrument, the Healthy Habits Survey, to evaluate its effectiveness in assessing relationships between knowledge, behavior, and self-efficacy. Topic areas included in the survey included digestion, physical activity, healthy meals and snacking, food groups, breakfast, and meal planning. Responses were scored from 1 to 4 with a higher score representing a more positive response. Scores for self-efficacy and behaviors were positively correlated ($r = 0.40$, $P = 0.0001$); while knowledge scores were not associated with self-efficacy ($r = 0.02$, $P = 0.88$) or behavior scores ($r = 0.14$, $P = 0.23$). These results indicate that the developed survey is reliable

and useful in evaluating SCT-based elementary nutrition education programs, particularly for self-efficacy and behaviors (2015).

The evaluation of literature has indicated that pediatric weight management programs should be multi-disciplinary and include a family component. Although many long-term programs show a greater incidence of a reduction in BM, short-term programs have shown significant results in knowledge and some behavior change. This study will seek to answer the following research questions:

- What is the baseline nutrition knowledge level of the students who participated in this program?
- Was the nutrition education effective for students?
- Can a short-term nutrition education program affect behavior change?
- Can a short-term nutrition education program affect physical change?

III. METHODS

In early 2016, researchers from the Department of Nutrition and Hospitality Management at the University of Mississippi (UM NHM) conducted an evaluation of a childhood obesity prevention/treatment program entitled *Families in Transformation (FIT*). The Institutional Review Boards of both the University of Mississippi and North Mississippi Health Services approved the *FIT* program and this evaluation study. Parents/guardians signed consent forms, and the students signed assent forms prior to the onset of the program. (Both consent and assent forms are found in Appendix A.) The *FIT* program was provided by the *Healthworks!* health education and fitness center in Tupelo, Mississippi, There were no incentives from the University of Mississippi for the children, or their parents/guardians, to participate in the *FIT* program, although upon completion of the program, each family received a $100 gift card to Kroger from the *Healthworks!* team. The program had a $25 participation fee, which was returned to the parents/guardians upon completion of the program.

Subjects

The *Healthworks!* staff recruited children and their parents from elementary and middle schools in Tupelo for *FIT,* and they were also the participants in this study. As seen in Table 1, both genders were almost equally represented and there was some ethnic diversity with 56% white, 25% black, and 19% multiracial students. As seen in Table 2, not all participants were at

risk for overweight or obesity. Some of these were referred by their physicians because of obesity risk, high blood pressure, and/or poor nutrition and/or physical activity status.

Table 1. Demographic characteristics of *FIT* participants

Variable	**Students (n = 18)**	**Parents (n=13)**
Mean age (years)	10.52 (1.26)	42.5 (3.92)
Gender		
Males	44%	8%
Females	56%	92%
Ethnicity		
White	56%	62%
Black	25%	23%
Hispanic	0%	0%
Asian	0%	8%
Multiracial	19%	0%
Other	0%	8%
Residence		
Apartment	13%	8%
House	75%	77%
Mobile home	13%	15%
Education level (parents only)		
8th grade		0%
High School/GED		0%
College/University		85%
Graduate/Professional		15%

Standard deviations are reported in parenthesis.

Procedures

The 8-week program consisted of weekly nutrition education sessions were held on Monday evenings, with the first 45 minutes dedicated to classroom instruction for the parents and children together and the second 45 minutes dedicated to address questions and concerns of parents with physical activity sessions for the children. Each nutrition education lesson was

taught by a registered dietitian from the North Mississippi Medical Center in Tupelo, Mississippi. The topics covered by the registered dietitian, were:

1. MyPlate. Students ran a relay race dropping food models into boxes labeled as the MyPlate food groups (protein, dairy, fruit, vegetable, and grain).
2. Label reading. Students ran intervals after reading nutrition labels on food models.
3. Serving size. Students were asked to estimate serving sizes among food models.
4. Grocery store survival. Students participated in a scavenger hunt to find healthy food items in the *HealthWorks!* simulated grocery store.
5. Healthy snacking. Students were asked to choose between healthy and not so healthy snacks with food models.

Children were required and parents were encouraged to attend 2 more 1-hour physical activity sessions on Tuesday evening and Thursday evening. Children and parents both received some supporting resources such as handouts, stretch bands, and weekly exercises to encourage their skill development. The children's activity programming focused on group physical activities and was conducted by a certified physical education instructor.

Measures

A physical assessment of each child was conducted on the first night of the *FIT* program and the last night. Heights, weights, blood pressure, heart rate, and fitness parameters which included: push-ups, sit-ups, chair-squats, and d step-ups. In addition to this, a 10 question nutrition quiz and 11 question health habit survey were given to both children and parents the first night and last night of the FIT program (Found in Appendix B). The researchers requested that parents not assist children in completing the quizzes and questionnaires. No participant was

excluded from taking the quizzes or surveys in the study. Participants completed both during program hours. On Monday evenings in weeks 2,4,5,6,and 7; a food frequency questionnaire was administered to both children and parents based on a 24 hour recall of eating behaviors (The FFQ can be found in Appendix B).

Data Analysis.

Demographic and beginning and ending heights and weights were analyzed using descriptive statistics. Pre and post intervention BMI was calculated for each student according to the following formula:

$$BMI = \frac{\text{weight (kg)}}{\text{height (cm)}^2}$$

BMI was then converted to age and gender-specific z scores according to the guidelines provided by the Centers for Disease Control and Prevention (CDC, 2015). The use of BMI z scores rather than direct BMI values helped to prevent factors such as differences in age and rate of growth from confounding the data. Pre and post-intervention mean BMI z scores and pre and post-intervention mean fitness test scores were compared using paired t-test with an alpha of 0.05. Chi square analysis was used to determine any category changes from pre to post intervention for the health habit survey questions or the nutrition quiz questions.

IV. RESULTS

As seen in Table 1, height and weight was recorded for each student pre and post-*FIT* program. When the students' BMI was compared to *Fitnessgram* performance standards (Plowman, 2014), the mean BMI for females and males, 27.17 ± 7.65 and 23.53 ± 5.25, respectively, were indicative of health risk. When compared to blood pressure tables from the National Heart and Blood Institute (2004) the mean blood pressures for both females and males were around the 90th percentile. Resting heart rate, however, was in the normal range of 70-120 beats per minute (Williams, 2015).

As seen in Table 2, significant differences between pre and post-program means of anthropometric and health data were seen for diastolic blood pressure in girls, changing from 67.82 ± 6.00 to 59.90 ± 9.31 and for the group as a whole (66.63 ± 8.81 to 63.75 ± 11.81). The students' body mass index (BMI) was calculated from heights and weights, and then BMI z scores were calculated to mitigate age and gender differences. No change was observed in the BIM z scores from pre to post-program. Resting heart rate also changed significantly for boys (76.78 ± 5.45 to 90.10 ± 7.68) and the total group (83.69 ± 8.60 to 93.13 ± 20.73).

Table 2. Anthropometric Health Data

Measure	Females	Males	Total
Height (cm)			
Pre	142.38 (11.19)	140.61 (16.18)	142.57 (12.42)
Post	143.58 (11.56)	144.62 (13.29)	143.71 (12.32)
Weight (kg)			
Pre	57.89 (18.01)	50.96 (15.31)	52.51 (16.42)
Post	60.17 (18.66)	49.96 (15.54)	53.52 (16.76)
BMI z score			
Pre	2.046 (0.543)	1.352 (1.031)	1.720 (0.860)
Post	2.161 (0.427)	1.340 (0.990)	1.775 (0.836)
Systolic BP (mm Hg)			
Pre	113 (12.24)	110.63 (12.83)	111.31 (12.42)
Post	113 (11.69)	109.00 (12.90)	112.25 (13.55)
Diastolic BP (mm Hg)			
Pre	67.82 (6.00)*	60.00 (10.86)	66.63 (8.81)*
Post	59.90 (9.31)*	66.00 (12.82)	63.75 (11.81)*
Resting heart rate (beats/min)			
Pre	94.27 (11.04)*	76.78 (8.45)	83.69 (8.60)*
Post	98.80 (22.51)*	90.140 (7.68)	93.13 (20.73)*

Standard deviations are reported in parentheses.

- $p < 0.05$.

Percent of student responses to the Health Habit Questionnaire can be found Table 3a and 3b. Significant differences between pre-program and post-program and post-program answers were:

- For question 5, the students reported watching less TV shows during the week as 13 percent answered “do not watch TV”, 65 percent answered to “2 to 3 shows”, and 24 percent answered “4 to 6 shows” pre-program; versus13 percent, 69 percent, and 19 percent, respectively, post-*FIT* ($p < 0.05$). In question 5, the percentages of answers indicated that they also watched television for less time, although the difference was not significant.
- For question 10, when asked at the beginning of the program how much physical activity they perform in a single day 41 percent of the students chose the answer “15 to 30 minutes”, 18 percent chose “30 to 60 minutes” and 35 percent chose “more than 60 minutes” and 35 percent chose “more than 60 minutes”. After the program 44 percent of students chose the answer “15 to 30 minutes”, 19 percent chose “ 30 to 60 minutes” and 31 percent chose “more than 60 minutes” ($p < 0.05$).

Effects on Snacking. To assess snacking habits the participants were asked “When it comes to snacks I eat…” and asked to respond “too much”, “little too many”, “the right amount”, “hardly any”, or “I don’t know”. The most frequent response post intervention was “the right amount”(44%), a slight decrease from the pre intervention survey (47%). There was no significant difference found in the children’s pre-intervention response and post-intervention response.

Effects on Screen Time. To evaluate the time spent watching television, using cellphones, tablets, or computers 6 questions were asked. Participants were asked to identify the amount of time they spent watching television during the week and most frequently responded “less than one hour” for both pre- and post-surveys (35%, 38% respectively). However, there

was a decrease in the response “3-4 hours per day”. 24% of children responded with “3-4 hours per day” pre intervention and decreased that response in post intervention (19%).

Table 3a. Results of pre-*FIT* health habit survey-students

Question	Pre-program survey answers				
1. Do you read food labels?	Always	Most of the time	Sometimes	Rarely	Never
	12%	12%	41%	12%	24%
2. At meals I eat…	Too much	Little too much	The right amount	Not enough	I don't know
	0%	18%	71%	6%	6%
3. When it comes to snacks I eat…	Too much	Little too many	The right amount	Hardly any	I don't eat snacks
	0%	18%	47%	12%	6%
4. During the week, how much time do you watch TV?	I don't watch TV	Less than 1 hour	1-2 hours per day	3-4 hours per day	More than 4 hours
	12%	35%	29%	24%	0%
5. During the week, how many TV shows do you watch?	I don't watch TV	2-3 shows	4-6 shows	6 or more shows	
	12%	65%	24%	0%	
6. During one weekday, how many hours do you spend on cellphones, tablets, or the computer?	I don't use these items	Less than 1 hour	1-2 hours	2-3 hours	3-4 hours
	6%	35%	35%	12%	12%
7. During the weekend, how much time do you watch TV?	I don't watch TV	Less than 1 hour	1-2 hours	3-4 hours	More than 4 hours
	18%	18%	35%	18%	12%
8. During the weekend, how many TV shows do you watch?	I don't watch TV	2-3 shows	4-6 shows	more than 6 shows	
	18%	47%	29%	6%	
9. During one weekend day, how many hours do you spend	I don't use these items	Less than 1 hour	1-2 hours	3-4 hours	More than 4 hours
on cellphones, tablets, or the computer?	0%	24%	41%	12%	24%
10. How much physical activity do you get in a normal day?	less than 15 minutes	15-30 minutes	30-60 minutes	more than 60 minutes	
	6%	41%	18%	35%	
11. How many days are you physically active during the week?	0-2 days	3-4days	5-7 days		
	12%	24%	65%		

Table 3b. Results of post-*FIT* health habit survey-students.

1. Do you read food labels?	**Always**	**Most of the time**	**Sometimes**	**Rarely**	**Never**	
	13%	13%	44%	13%	19%	0.251
2. At meals I eat…	Too much	Little too much	The right amount	Not enough	I don't know	
	0%	19%	69%	6%	6%	0.555
3. When it comes to snacks I eat…	Too much	Little too many	The right amount	Hardly any	I don't eat snacks	
	0%	19%	44%	13%	6%	0.398
4. During the week, how much time do you watch TV?	I don't watch TV	Less than 1 hour	1-2 hours per day	3-4 hours per day	More than 4 hours	
	13%	38%	31%	19%	0%	0.399
5. During the week, how many TV shows do you watch?	I don't watch TV	2-3 shows	4-6 shows	6 or more shows		
	13%	69%	19%	0%		< 0.05
6. During one weekday, how many hours do you spend on cellphones, tablets, or the computer?	I don't use these items	Less than 1 hour	1-2 hours per day	2-3 hours	3-4 hours	
	6%	38%	31%	13%	13%	0.331
7. During the weekend, how much time do you watch TV?	I don't watch TV	Less than 1 hour	1-2 hours	3-4 hours	More than 4 hours	
	19%	19%	31%	19%	13%	0.095
8. During the weekend, how many TV shows do you watch?	I don't watch TV	2-3 shows	4-6 shows	more than 6 shows		
	19%	31%	44%	6%		0.221
9. During one weekend day, how many hours do you spend on cellphones, tablets, or the computer?	I don't use these items	Less than 1 hour	1-2 hours	3-4 hours	more than 4 hours	
	0%	25%	38%	13%	25%	0.457
10. How much physical activity do you get in a normal day?	less than 15 minutes	15-30 minutes	30-60 minutes	more than 60 minutes		
	6%	44%	19%	31%		< 0.05
11. How many days are you physically active during the week?	0-2 days	3-4 days	5-7 days			
	13%	25%	63%			0.209

Respondents were then asked the number of hours that they spend using cellphones, tablets, or computers on one weekday. Post intervention results show that there was a decrease in the response "1-2 hours per day" (31%) and an increase in "less than 1 hour per day" (38%). Although no significant difference was found, it may be conclude that students reduced screen time from 1 to 2 hours per day to less than one hour per day post intervention. In addition to this, when asked "during the weekend, how much time do you watch TV?" there was no significant difference found in children's responses pre- and post- intervention. However, a significant difference was found among the responses of the parents. Parents decreased television time on the weekend.

Effects on Physical Activity. To evaluate physical activity habits the question "how much physical activity do you get in a normal day" was asked. The most frequent response among children pre intervention was "15-30 minutes" (41%) and remained the most frequent answer post intervention (44%). However, using chi square analysis, a significant difference was found in physical activity in a normal day. Results show that there was an increase in both parents and children.

Both the control and the reinforcing intervention students learned more nutrition knowledge. The percentages of student participants who selected each answer on the pre and post-program nutrition and fitness quiz are found in Tables 4a and 4b.

Table 4a. Results of pre-*FIT* nutrition quiz – students.

Questions	Pre-Program survey results				
How many food groups are shown in MyPlate?	6	10	5	1	I don't know
	10%	0%	55%	5%	30%
How many cups of fruit should you eat each day?	none	1 0r 2	3 or more	I don't know	
	0%	50%	45%	5%	
When buying fruit juice, how often is it 100% juice?	Almost always	sometimes	almost never	I don't know	I don't drink juice
	40%	30%	0%	15%	15%
About how much of your plate should be fruits and vegetables?	one quarter	one half	three quarters	all of it	
	25%	70%	0%	5%	
A serving size is	the amount in the package	the amount you eat at one meal	depends n the food and is listed on the label	is different for everyone	
	15%	30%	45%	10%	
A food that is labeled "low fat" always has fewer calories than the regular version	TRUE	FALSE			
	50%	50%			
Which of the following is the healthiest snack?	Cookies and milk	canned soda and raisins	peanut butter toast and an orange	cheese, crackers & fruit punch	
	5%	0%	75%	20%	
you should warm up every time you exercise	TRUE	FALSE			
	95%	5%			
You can get more fit by…	shopping	raking leaves	doing laundry	cooking	
	15%	80%	0%	5%	
What is a balanced exercise plan?	running, weights, stretch	running, weights, tennis	running, cycling, tennis	weights, hiking, leg lifts	
	50%	5%	10%	35%	

Table 4b. Results of post-*FIT* nutrition quiz – students.

	Post-Program survey results					Probability
How many food groups are shown in MyPlate?	6	10	5	1	I don't know	
	0%	0%	94%	0%	6%	0.738
How many cups of fruit should you eat each day?	None	1 or 2	3 or more	I don't know		
	0%	47%	41%	12%		< 0.001
When buying fruit juice, how often is it 100% juice?	Almost always	sometimes	almost never	I don't know	I don't drink juice	
	29%	12%	12%	12%	12%	0.109
About how much of your plate should be fruits and vegetables?	one quarter	one half	three quarters	all of it		
	0%	88%	6%	6%		< 0.001
A serving size is	is the amount in the package	is the amount you eat at one meal	depends on the food and is listed on the label	is different for everyone		
	0%	29%	59%	12%		0.157
A food that is labeled "low fat" always has fewer calories than the regular version	TRUE	FALSE				
	29%	71%				0.044
Which of the following is the healthiest snack?	cookies and milk	canned soda and raisins	peanut butter toast and an orange	cheese, crackers & fruit punch		
	0%	0%	82%	18%		0.288
you should warm up every time you exercise	TRUE	FALSE				
	100%	0%				
You can get more fit by…	shopping	raking leaves	doing laundry	cooking		
	29%	71%	0%	0%		
What is a balanced exercise plan?	running, weights, stretch	running, weights, tennis	running, cycling, tennis	weights, hiking, leg lifts		
	65%	0%	18%	18%		< 0.001

Table 5. Chi Square analysis of student nutrition and fitness quiz scores, before and after the nutrition education reinforcing physical activity.

Question	Chi Square	Probability of a larger value
How many food groups are shown in MyPlate?	0.11	0.739
How many cups of fruit should you eat each day?	29.64	< 0.001
When buying fruit juice, how often is it 100 % fruit juice?	2.57	0.109
About how much of your plate should be fruits and vegetables?	85.10	0.000
A serving size	2.00	0.157
A food that is labeled "low fat" always has fewer calories than the regular version?	4.05	0.044
Which of the following is the healthiest snack?	1.13	0.289
You should warm up every time you exercise[1]		
You can get more fit by	0.00	1.000
What is a balanced exercise plan?	40.50	0.000

[1] This question was answered correctly by every participant both before and after the program.

To assess knowledge on portion size, student respondents were asked to identify how many food groups are shown in My Plate using the answers "6", "10", "5". "1" or " I don't know". A chi square analysis found no significant difference in children's responses from the pre- to post-quiz. In addition, when answering the question "How many cups of fruit should you eat each day?" a greater percent of students responded "I don't know" post-test than pre-test. Figures 1 illustrates that the scores on the pre and post nutrition quiz were higher for most of the questions.

Pearson's correlation coefficients for the mean student data for the food frequency questionnaire versus program week are seen in Table 6. Relatively strong, positive correlation coefficients were seen for the students as they reported eating more fruit (correlation coefficient: 0.898322608) and drinking more water (correlation coefficient: 0.937756778).

Figure 1. Number of correct student responses for the nutrition and fitness quiz –pre and post-*FIT*, all students.

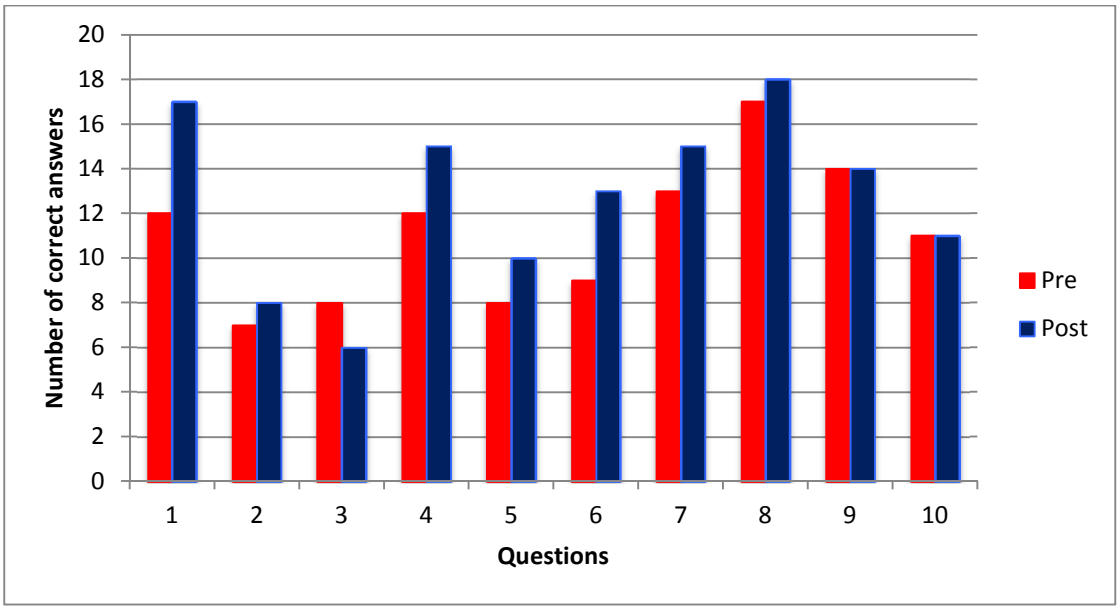

Table 6. Student food frequency data correlated by program week.

	Week of Project FIT							
Food Group	**1**	**2**	**3**	**4**	**5**	**6**	**Correlation Coefficients**	**P-Value**
Fruits	2.09	2.67	NA	2.46	2.79	3.09	0.898322608	0.038
Vegetables	1.45	2.58	NA	2.00	2.00	2.00	0.201028146	0.746
Breads	2.36	2.42	NA	2.62	2.21	2.00	-0.638404059	0.246
Protein	2.00	2.67	NA	2.00	2.36	2.36	0.233811809	0.705
Dairy	2.18	2.67	NA	2.69	2.64	2.64	0.651715729	0.233
Soda	0.36	0.75	NA	0.62	0.36	0.36	-0.340768416	0.575
Sports drinks	0.09	0.17	NA	0.23	0.36	0.18	0.597420777	0.287
Water	2.45	2.75	NA	2.69	2.86	3.09	0.937756778	0.018
Whole wheat bread	1.55	2.17	NA	1.62	1.86	1.91	0.265953002	0.665
Chips/salt	1.55	0.75	NA	1.23	1.21	1.18	-0.146531076	0.814
Sweets	0.91	0.58	NA	1.00	0.86	1.00	0.420024994	0.481

V. DISCUSSION

Findings from this research indicate that the *FIT* weight management program may have had an effect on time spent watching television and participating in physical activity due to the statistically significant differences in these areas. Both children and parents reported watching less television shows during the week with parents watching less television on the weekend. In addition, children and parents reported being more physically active during a normal weekday while parents increased the number of days that they were physical active during the week.

The program also showed a significant change in label reading. Parents reported that they read food labels less after the intervention. This decrease may be explained by the self-awareness parents gained through nutrition education sessions. It is possible that parents were reading what they believed to be the correct nutrition label on particular food items and after the intervention found that they were not viewing the actual food label itself. This can also be confirmed through the results found in the nutrition knowledge quiz which found an increase in knowledge whereas the nutrition habits survey found no significant increase in habits. Other studies have also shown similar results. For instance, Katz *et al.* found that only a small impact was seen on some health behaviors and outcomes but did not find this surprising due to the short duration of the study.

The study did not find significant changes in BMI. This supports the findings of similar studies that reported that short term programs do not typically see a decrease in BMI, especially in children and should not be the sole indicator of a weight management programs success (Strauss, 2000). Those studies that do find a reduction in BMI may be due to natural growth and

development that is seen during this stage of adolescence. Longer-lasting interventions may be more likely to change BMI.

Significant differences were found, however, in diastolic blood pressure in girls, changing from 67.82 ± 6.00 to 59.90 ± 9.31 and for the group as a whole (66.63 ± 8.81 to 63.75 ± 11.81). Resting heart rate also changed significantly for boys (76.78 ± 5.45 to 90.10 ±7.68) and the total group (83.69 ± 8.60 to 93.13 ± 20.73). According to the American Heart Association (2016), it is important for children to maintain a healthy heart through weight maintenance, regular participation in physical activity, and consuming a heart healthy diet. In lowering the children's diastolic blood pressure, a significant impact in future health may be seen.

The data from the food frequency questionnaire, nutrition habits survey, and nutrition quiz portrays how a number of self-reported aspects of healthy eating behaviors and physical activity were improved. Knowledge of healthy eating behaviors and levels of exercise were relatively low to begin with and improved upon completion of the FIT program.

It can be concluded that the FIT program had a significant impact on the fitness of the children that participated in the program. In addition to the food frequency data and increased nutrition knowledge it can be inferred that the program can be beneficial in the carryover nutrition knowledge and weight management of children. Nutrition education for both parents and children can lead to positive changes in nutrition knowledge and behaviors because parents ultimately make the food purchasing decisions and have influence over children's habits.

Limitations

The results of this study are subject to some limitations. The food frequency questionnaires and nutrition habits survey relied on self-reporting, which may not depict actual behavior. Zeller and Modi (2009) report that the honest of self –report changes in behavior are questionable no matter the development of any self-report instrument.

Another limitation of the present study is the relatively small sample size, which may not be large enough to support significant differences in the data. In addition to this, using a small sample size limits the generalizability of the results.

The short length of the *FIT* program makes it unlikely that there would be any significant changes in any of the participants' weight. However, a follow-up evaluation of the Child and Adolescent Trial for Cardiovascular Health (1999) found that behavioral changes in diet and physical activity introduced during elementary years can carry over into adolescence. To have a greater impact on health outcomes, such as weight, it is likely that a longer study period in addition to follow-up procedures may be necessary.

The lack of follow-up of the participants in the *FIT* program is an obvious limitation. Some research such as Mukelbaurer *et al.* (2009), found that long-term follow-up should be a key part of weight management programs. Improvements to lifestyle habits are typically sustained through time.

Conclusions

Results from this study show a significant impact on the health and nutrition knowledge of students as well as some changes in eating behaviors. This is proof that a short-term pediatric weight management program, such as *FIT*, can result in positive outcomes. Although there was

no significant change in BMI, nutrition knowledge through survey and quizzes showed positive changes over the duration of the program. These increases in nutrition related knowledge and the lowering of blood pressures seen in the children make the case for a successful program. This program is an asset to the community, assisting families in leading healthier lives. This program is beneficial in teaching families that are overweight, or families about nutrition, physical activity, and health, making it an asset in changing the obesity epidemic that is currently being seen across our nation.

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VII. APPENDIX

APPENDIX A.

CONSENT AND ASSENT FORMS

APPENDIX A.1. PARENT CONSENT FORM

Consent for You and Your Child to Participate in Research

Study Title: Development and Evaluation of *Families in Transition (FIT)*, a wellness center based weight management program for children.

Investigator
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and

Faculty Sponsor
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Lenoir Hall
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The purpose of this study
We want to measure what effects the *Families in Transition (FIT)* program will have on your child's eating habits, weight, and fitness level. We also want to know how your support effects the results your child gets from the program.

What you and your child will do for this study
You and your child will allow *HealthWorks* to share your child's **unidentified** height, weight, and fitness scores with us. Our child will also be asked to wear an "activity tracker" that will measure their physical activity for the eight weeks of the program. We will also ask you and your child to take brief surveys at the beginning and at the end of the program. These surveys will be about their eating habits, what they have learned in the program, and how this does or does not affect how the family eats and exercises. Finally, your child will be asked five or six questions each Thursday evening. These will be questions about their diet and eating habits.

Time required for this study
This study will take about 1 hour for the 1st day and 1 hour for the last day of the program and about 15 extra minutes per week.

Possible risks from participation
There are no known risks for you or your child's participation in the study.

Benefits from participation
There are no known incentives and/or benefits for you or your child's participation in the study.

Confidentiality
All health information in the study will be collected from you and your child by *HealthWorks* and given to the researchers anonymously: it will not be possible for anyone, even the researchers, to associate you with your responses or your child's responses.

decides that you do not want to finish, just tell the experimenter. Whether or not you and your child participate or withdraw will not affect your current or future relationship with *HealthWorks*, North Mississippi Health Systems, or with the University of Mississippi, and it will not cause you to lose any benefits to which you are entitled.

Protected Health Information
Protected health information is any personal health information which identifies you or your child in some way. The data collected in this study includes: height, weight, and fitness scores. A decision to participate in this research means that you agree to the use of your health information and your child's health information for the study described in this form. This information will not be connected to your child and will not be released beyond the purposes of conducting this study. The information collected for this study will be kept only until July 1, 2016. You may request access to this information at any time.

IRB Approval
This study has been reviewed North Mississippi Health Systems' and The University of Mississippi's Institutional Review Boards (IRB). The IRB has determined that this study fulfills the human research subject protections obligations required by state and federal law and University policies. If you have any questions or concerns regarding your rights or your child's rights as a research participant, please contact the IRB at (662) 915-7482 or .

Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, then decide if you want your child to be in the study or not.

Statement of Consent
I have read the above information. I have been given an unsigned copy of this form. I have had an opportunity to ask questions, and I have received answers. I consent to participate in the study and to allow my child to participate.

Furthermore, I also affirm that the experimenter explained the study to me and told me about the study's risks as well as my right and my child's right to refuse to participate and to withdraw.

Signature of Participant _____ Date _____

Printed name of Participant Printed name of Participant's Child

NOTE TO PARTICIPANTS: DO NOT SIGN THIS FORM

IF THE IRB APPROVAL STAMP ON THE FIRST PAGE HAS EXPIRED

APPENDIX A.2. CHILD ASSENT FORM

CHILD ASSENT

Oral Assent Script with Record of Child's (Aged 7-13) Response

I would like to ask you to help me with a project that I am doing at The University of Mississippi. If you agree, you would allow *HealthWorks* to give me your height, weight, and fitness scores without your name on them. You will also be asked to wear an "activity tracker" that will measure your physical activity for the eight weeks of the program. We will also ask you take a 12 question survey at the beginning and at the end of the program. These surveys will be about their eating habits, what you have learned in the program. You will also be asked five or six questions each Thursday evening about your diet and eating habits. The surveys will take about 15 minutes. The questions will take about 10 minutes each Thursday.

What questions do you have about what you will do for me?

Will you do this?

Name: _____ Date: _____

Response: ❑ YES ❑ NO

APPENDIX B.

INSTRUMENTS

APPENDIX B.1. PARENT PRE AND POST-PROGRAM HEALTH HABIT SURVEY AND NUTRITION FITNESS QUIZ

Project FIT
Parent/Guardian Questions

A. Survey data. Circle answer.

1. Do you read food labels?
   a. Always
   b. Most of the time
   c. Sometimes
   d. Rarely
   e. Never

2. At meals I eat
   a. Too much
   b. A little too much
   c. Just the right amount
   d. Not enough
   e. I don't know

3. When it comes to snacks, I eat
   a. Too much
   b. A little too many
   c. Just the right amount
   d. Hardly any
   e. I don't eat snacks
   f. I don't know

4. Which of the following is protein?
   a. Eggs
   b. Meat
   c. Beans

d. All of the above
e. I don't know

5. During the week (Monday through Friday or your work week if different), how much time do you watch TV?
   a. I don't watch TV
   b. Less than 1 hour
   c. 1 – 2 hours a day
   d. 3 – 4 hours a day
   e. more than 4 hours a day

6. During the week, (Monday through Friday or your work week if different), how many TV shows do you watch?
   a. I don't watch TV
   b. 2 – 3 shows
   c. 4 – 6 shows
   d. 7 or more shows

7. During one weekday (Monday through Friday or one of your work days, if different), how many hours do you spend on cell phones, tablets, or the computer?
   a. I don't use these items.
   b. Less than 1 hour
   c. 1 – 2 hours
   d. 3 – 4 hours
   e. More than 4 hours

8. During the weekend (or one of your off days, if different), how much time do you watch TV?
   a. I don't watch TV
   b. Less than 1 hour
   c. 1 – 2 hours a day
   d. 3 – 4 hours a day
   e. more than 4 hours a day

9. During the weekend (or one of your off days, if different), how many TV shows do you watch?
    a. I don't watch TV
    b. 2 – 3 shows
    c. 4 – 6 shows
    d. 7 or more shows

10. During weekend (or one of your off days, if different), how many hours do you spend on cell phones, tablets, or the computer?
    a. I don't use these items.
    b. Less than 1 hour
    c. 1 – 2 hours
    d. 3 – 4 hours
    e. More than 4 hours

11. How many days are you physically active each week?
    a. 0 – 2 days
    b. 3 – 4 days
    c. 5 – 7 days

12. How much physical activity (exercise or physical work) do you get in an average day?
    a. Less than 15 minutes
    b. 15 – 30 minutes
    c. 30 – 60 minutes
    d. More than 60 minutes

B. Nutrition quiz. Circle the correct answer(s).

1. How many food groups are shown in MyPlate?
    a. 6
    b. 10

c. 5
d. 1
e. I don't know

2. How many cups of fruit should you eat each day?
   a. None
   b. 1 or 2
   c. 3 or more
   d. I don't know

3. When buying fruit juice, how often is it 100 % fruit juice?
   a. Almost always
   b. Sometimes
   c. Almost never
   d. I don't know.
   e. I do not drink juice.

4. About how much of your plate should be fruits and vegetables?
   a. One quarter
   b. One half
   c. Three quarters
   d. All of it

5. A serving size
   a. Is the amount in the package.
   b. Is the amount you eat at one meal.
   c. Depends on the food and is listed on the label.
   d. Is different for everyone.

6. A food that is labeled "low fat" always has fewer calories than the regular version

a. True
b. False

7. Which of the following is the healthiest snack?
   a. Cookies and milk
   b. Canned soda and raisins
   c. Peanut butter on toast and an orange
   d. Cheese and crackers and fruit punch

8. You should warm up every time you exercise
   a. True
   b. False

9. You can get more fit by
   a. Shopping
   b. Raking Leaves
   c. Doing Laundry
   d. Cooking

10. What is a balanced exercise plan?
    a. Running, weight lifting, stretching
    b. Running, weight lifting, tennis
    c. Running, cycling, tennis
    d. Weight lifting, hiking, leg lifts

Participant data

1. My gender
   a. Male
   b. Female

2. My education level
   a. 8th grade
   b. HIigh school or GED
   c. College or university

d. Graduate and/or professional school

3. My ethnicity
   a. Black
   b. White
   c. Asian
   d. Hispanic
   e. Multiracial
   f. Other

4. My family lives in a(n)
   a. Apartment
   b. House
   c. Mobile Home

5. My age
   a. <25
   b. 25-29
   c. 30-34
   d. 35-39
   e. 40-45
   f. >45

APPENDIX B.2. STUDENT PRE AND POST-PROGRAM HEALTH HABIT SURVEY AND NUTIRION FITNESS QUIZ

Project FIT
Student Questions

C. Survey data. Circle answer.

1. Do you read food labels?
   a. Always
   b. Most of the time
   c. Sometimes

d. Rarely
e. Never

2. At meals I eat
   a. Too much
   b. A little too much
   c. Just the right amount
   d. Not enough
   e. I don't know

3. When it comes to snacks, I eat
   a. Too much
   b. A little too many
   c. Just the right amount
   d. Hardly any
   e. I don't eat snacks
   f. I don't know

4. During the week (school days), how much time do you watch TV?
   a. I don't watch TV
   b. Less than 1 hour
   c. 1 – 2 hours a day
   d. 3 – 4 hours a day
   e. more than 4 hours a day

5. During the week, (school day), how many TV shows do you watch?
   a. I don't watch TV
   b. 2 – 3 shows
   c. 4 – 6 shows
   d. 7 or more shows

6. During one weekday (school day), how many hours do you spend on cell phones, tablets, or the computer?
   a. I don't use these items.
   b. Less than 1 hour
   c. 1 – 2 hours
   d. 3 – 4 hours

e. More than 4 hours

7. During the weekend, how much time do you watch TV?
   a. I don't watch TV
   b. Less than 1 hour
   c. 1 – 2 hours a day
   d. 3 – 4 hours a day
   e. more than 4 hours a day

8. During the weekend, how many TV shows do you watch?
   a. I don't watch TV
   b. 2 – 3 shows
   c. 4 – 6 shows
   d. 7 or more shows

9. During one weekend day, how many hours do you spend on cell phones, tablets, or the computer?
   a. I don't use these items.
   b. Less than 1 hour
   c. 1 – 2 hours
   d. 3 – 4 hours
   e. More than 4 hours

10. How much physical activity (exercise or physical work) do you get in a normal day?
   a. Less than 15 minutes
   b. 15 – 30 minutes
   c. 30 – 60 minutes
   d. More than 60 minutes

11. How many days are you physically active each week?
   a. 0 – 2 days
   b. 3 – 4 days
   c. 5 – 7 days

D. Nutrition quiz. Circle the correct answer(s).

1. How many food groups are shown in MyPlate?
    a. 6
    b. 10
    c. 5
    d. 1
    e. I don't know

2. How many cups of fruit should you eat each day?
    a. None
    b. 1 or 2
    c. 3 or more
    d. I don't know

3. When buying fruit juice, how often is it 100 % fruit juice?
    a. Almost always
    b. Sometimes
    c. Almost never
    d. I don't know.
    e. I do not drink juice.

4. About how much of your plate should be fruits and vegetables?
    a. One quarter
    b. One half
    c. Three quarters
    d. All of it

5. A serving size
    a. Is the amount in the package.
    b. Is the amount you eat at one meal.
    c. Depends on the food and is listed on the label.
    d. Is different for everyone.

6. A food that is labeled "low fat" always has fewer calories than the regular version

a. True
b. False

7. Which of the following is the healthiest snack?
   a. Cookies and milk
   b. Canned soda and raisins
   c. Peanut butter on toast and an orange
   d. Cheese and crackers and fruit punch

8. You should warm up every time you exercise
   a. True
   b. False

9. You can get more fit by
   a. Swinging
   b. Riding bikes
   c. Playing video games
   d. Shopping

10. What is a balanced exercise plan?
    a. Running, weight lifting, stretching
    b. Running, weight lifting, tennis
    c. Running, cycling, tennis
    d. Weight lifting, hiking, leg lifts

Student data

1. I am
   a. Male
   b. Female

2. My family lives in a(n)
   a. Apartment
   b. House
   c. Mobile Home

3. I am
    a. Black
    b. White
    c. Asian
    d. Hispanic
    e. Multiracial
    f. Other

APPENDIX B.3. STUDENT AND PARENT FOOD FREQUENCY QUESTIONNAIRE

In the last 24 hours, how many servings did you eat or drink from each of these?

Fruits	**0**	**1**	**2**	**3**	**4**	**5**
Vegetables	**0**	**1**	**2**	**3**	**4**	**5**
Breads, cereals, rice and grain	**0**	**1**	**2**	**3**	**4**	**5**
Meats and other protein foods	**0**	**1**	**2**	**3**	**4**	**5**
Milk, cheese, and other dairy	**0**	**1**	**2**	**3**	**4**	**5**
Sodas	**0**	**1**	**2**	**3**	**4**	**5**
Sports drinks (like Gatorade)	**0**	**1**	**2**	**3**	**4**	**5**
Water	**0**	**1**	**2**	**3**	**4**	**5**
Whole wheat bread, pasta, or cereal	**0**	**1**	**2**	**3**	**4**	**5**
Chips or other salty snack	**0**	**1**	**2**	**3**	**4**	**5**
Cookies, cakes, or other sweets	**0**	**1**	**2**	**3**	**4**	**5**

APPENDIX C.

FITNESS DATA

APPENDIX C. PRE AND POST FITNESS DATA

Pre-Rest BP	Post-Rest BP	Pre-Push Up	Post-Push Up	Pre-Sit Up	Post-Sit Up	Pre-Chair Squat	Post-Chair Squat	Pre-Step Test 3 min	Post-Step Test 3 min
135/72	124/73	18	21	46	47	34	34	117	126
127/57	106/48	3	16	43	40	25	28	135	127
124/68	117/60	20	21	32	39	24	32	113	117
106/75	135/80	22	32	42	45	29	32	126	115
118/63	108/55	17	21	37	48	31	37	134	131
99/72	108/56	18	17	42	51	27	32	137	133
106/66	110/58	10	8	38	51	30	39	130	129
95/60	91/52	5	12	28	39	31	37	113	115
117/49	108/50	24	34	44	50	17	44	130	129
120/69	115/66	12	17	42	45	21	22	122	105
n/a	n/a	15	25	37	43	57	51	117	105
96/71	104/61	5	18	29	42	23	28	126	132
97/39	107/88	10	14	46	38	35	29	132	119
96/62	93/55	18	20	46	48	29	39	94	95
113/67	102/66	4	17	39	36	25	26	106	113
116/63	134/76	28	21	43	48	50	41	137	115
		14.31	**19.63**	**39.63**	**44.38**	**30.50**	**34.44**	**123.06**	**119.13**

APPENDIX D.

PARENT DATA

APPENDIX D.1. PARENTS RESULTS OF PRE-PROJECT *FIT* HEALTH HABIT SURVEY

	Pre-Program Survey				
Do you read food labels?	Always	Most of the time	Sometimes	Rarely	Never
	6%	44%	44%	0%	6%
At meals I eat	Too much	Little too much	The right amount	Not enough	I don't know
	17%	44%	39%	0%	0%
When it comes to snacks I eat	Too much	Little too many	The right amount	Hardly any	I don't eat snacks
	6%	56%	22%	11%	0%
During the week, how much time do you watch TV?	No TV	Less than 1 hr	1-2 hrs	3-4 hrs	more than 4 hrs
	11%	33%	33%	17%	6%
during the week, how many TV shows do you watch?	No TV	2-3 shows	4-6 shows	6 or more	
	11%	72%	11%	6%	0%
During one weekday, how many hours do you spend on cellphones, tablets, computers, etc?	No Tech	Less than 1 hr	1-2 hrs	3-4 hrs	more than 4 hrs
	0%	17%	33%	6%	44%
During the weekend, how much time do you watch TV?	No TV	Less than 1 hr	1-2 hrs	3-4 hrs	more than 4 hrs
	17%	11%	39%	28%	6%
During the weekend, how many TV shows do you watch?	No Tv	2-3 shows	4-6 shows	7 or more	
	22%	50%	28%	0%	
During one weekend day, how many hrs do you spend on cellphones, tablets, computers?	No Tech	Less than 1 hr	1-2 hrs	3-4 hrs	more than 4 hrs
	0%	6%	56%	11%	28%
How much physical activity do you get in a normal day?	Less than 15 mins	15-30 mins	30-60 mins	more than 60 mins	
	33%	28%	17%	22%	
How many days are you physically active during the week?	0-2 days	3-4 days	5-7 days		
	56%	33%	11%		

APPENDIX D.2. PARENT RESULTS OF POST-PROJECT *FIT* HEALTH HABIT SURVEY

	Pre-Program Survey				
Do you read food labels?	Always	Most of the time	Sometimes	Rarely	Never
	6%	44%	44%	0%	6%
At meals I eat	Too much	Little too much	The right amount	Not enough	I don't know
	17%	44%	39%	0%	0%
When it comes to snacks I eat	Too much	Little too many	The right amount	Hardly any	I don't eat snacks
	6%	56%	22%	11%	0%
During the week, how much time do you watch TV?	No TV	Less than 1 hr	1-2 hrs	3-4 hrs	more than 4 hrs
	11%	33%	33%	17%	6%
during the week, how many TV shows do you watch?	No TV	2-3 shows	4-6 shows	6 or more	
	11%	72%	11%	6%	0%
During one weekday, how many hours do you spend on cellphones, tablets, computers, etc?	No Tech	Less than 1 hr	1-2 hrs	3-4 hrs	more than 4 hrs
	0%	17%	33%	6%	44%
During the weekend, how much time do you watch TV?	No TV	Less than 1 hr	1-2 hrs	3-4 hrs	more than 4 hrs
	17%	11%	39%	28%	6%
During the weekend, how many TV shows do you watch?	No Tv	2-3 shows	4-6 shows	7 or more	
	22%	50%	28%	0%	
During one weekend day, how many hrs do you spend on cellphones, tablets, computers?	No Tech	Less than 1 hr	1-2 hrs	3-4 hrs	more than 4 hrs
	0%	6%	56%	11%	28%
How much physical activity do you get in a normal day?	Less than 15 mins	15-30 mins	30-60 mins	more than 60 mins	
	33%	28%	17%	22%	
How many days are you physically active during the week?	0-2 days	3-4 days	5-7 days		
	56%	33%	11%		

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